

BOOK REVIEW

A revision of the Scaphopoda from Australian waters (Mollusca)

Kevin L. Lamprell & John M. Healy. 1998. *Records of the Australian Museum Supplement 24*: 189 pp.

Like evolution, the process of naming the global molluscan fauna proceeds in leaps and bounds. And what a giant leap Kevin Lamprell and John Healy have made with the publication of their monograph on the Scaphopoda (tusk shells) of Australia. This comprehensive work, the first study of the country's scaphopod fauna since 1959, covers all the 108 living Australian species, 47 of which are newly described, and 28 are named species not previously recorded from these waters. One new family (Omniglyptidae) is recorded and *Dentalium* (Dentaliidae), the largest genus in the work, contains 38 species. Each species has a full description of the shell and (where possible) the radula, each is compared with related species, and the distribution of each is summarised with a map. Australian fossil scaphopods are mentioned, but not reviewed taxonomically.

For me the most impressive aspect of this monograph lies in the great number of new species described. These 47 new species (43.5% of all the species in the monograph) reflect a totally unexpected biodiversity of the Scaphopoda in Australia. Many of these new species are presumed to be endemic. Prior to this work, Australian malacologists had relegated the Scaphopoda to the status of a 'second class' class having very low diversity relative to the other major groups of molluscs (some 30 species were known). The statistics presented by Bouchet (1997) in his recent seminal paper 'Inventorying the Molluscan Diversity' reinforce this impression. Bouchet showed that there had been an average of only 4.4 new fossil and living species of scaphopods described yearly in the world over the period 1967-1993. This figure compares with 657.8 for the Gastropoda. Obviously the Scaphopoda is much richer and more diverse than malacologists had previously believed, and Lamprell and Healy clearly indicate this Australian chapter is not the end of the story. They predict more new species and even new genera of scaphopods will be discovered in Australian waters when/if the collecting effort intensifies, particularly when additional sampling is undertaken in depths greater than 100 metres.

Another major taxonomic study of the Scaphopoda was undertaken simultaneously, yet independently, to the present study (Scarabino 1995). Victor Scarabino has documented the scaphopods collected on French expeditions in the tropical Indo-Pacific Ocean over the previous 20 years, many species coming from very deep water (800-3750 metres) and some of them from northern Australia. The most significant outcome in this context of unexpected biodiversity is the description by Scarabino of almost the same number of new species (42) as Lamprell and Healy. Clearly Pilsbry (in the preface to Pilsbry &

Sharp's (1897-1898) treatment of the Scaphopoda in the Manual of Conchology) was right when he exclaimed: 'the list of species now known is doubtless a mere fraction of the grand total of living forms'. Little has changed after a century.

Lamprell and Healy's monograph stands significantly amongst others on Australian molluscs in that it was written by amateurs (i.e. 'anyone who is not paid specifically for his/her work in malacology' following Bouchet's definition). Tragically this unexpected biodiversity would have gone unrecorded under the present strategic approach to research embraced by today's underfunded and understaffed scientific institutions. This work is a real tribute to the unstinting quest for knowledge for its own sake embodied by the endeavours of both authors.

In examining large series of specimens for most species, the authors have been able to assess intraspecific variation quite thoroughly. They concluded (page 6): 'most conchological features vary to some extent within species but usually within definable limits.' The intraspecific variation they have documented is really more daunting than these words might indicate. For example, within a single population of *Dentalium exmouthensis* the apex varies from entire, to shallowly notched, to deeply notched, to deeply slit. As well, some anatomical features were discovered to vary significantly. For example the length of the radular ribbon varies between species and genera, and to some extent also between the sexes (females have relatively longer radulae than males of the same species).

This monograph's most attractive feature are the magnificent illustrations. All the species are illustrated by photographs as well as line drawings, each technique complimenting the other. The line drawings executed by Ms C. Eadie were prepared for *Mollusca: The Southern Synthesis* and demonstrate superb artistry in their own right.

Lamprell and Healy's initial decisions in writing up this study will have a major impact on its longevity and utility. It is conchologically based and the authors make no pretence that the higher classification they have adopted will not change when anatomical data become available. Indeed they acknowledge (page 173) that there is already discord between shell-based and radular-based higher classifications and (page 174) that some species cannot be placed unequivocally into families on shell characters at present.

This tension between the demands of an objective taxonomy and the subjective assessment of characters is most obvious in the presentation of dichotomous keys utilising only shell characters. The inclusion of such keys as an aid to naming species is highly commendable, but constructing robust keys is an extremely difficult task. In constructing a key, one must assume the reader has no knowledge of either the subject or the authors' preconceptions. In other words, there must be no possibility for subjective assessment of characters on the part of the reader. In my opinion some of the alternatives in the keys in the work are overly simplistic because of the *a priori* assumption the reader has the same knowledge base as the authors and this is not always the case. For instance I went wrong in using the key to families of the Dentaliida (page 15) to identify a common species from the Darwin area. I could clearly make out microscopic longitudinal ornamentation on the apical section of all the shells before me so I

concluded the species belonged to Dentaliidae. In fact it belongs to the Laevidentaliidae which should have completely smooth shells according to the first dichotomy in the key. How was I to know that there was a subjective difference between the magnitude of the ornamentation; strong ribs (Dentaliidae) versus weak striae (all other families)? In fact the longitudinal ornamentation on the shell of the species I was keying out (*Laevidentalium longitorsum*) is very similar to that of species of *Grapacme* (Dentaliidae), so I did not feel so disappointed when I eventually found out (page 127) that the placement of *L. longitorsum* in the Laevidentaliidae is not settled. Neither, it seems, is the family for the oldest fossil species assigned to the Scaphopoda established conclusively for exactly the same reason; *Rhytidentalium kentuckyense* dates from the Middle Ordovician of North America. It appears to have a smooth shell and so was originally placed in the Laevidentaliidae, but Lamprell and Healy question this placement (page 11) because they argue any weak longitudinal ornamentation that could have been present on the shell would have been lost through the process of fossilisation. Could they tacitly doubt the importance of longitudinal ornamentation as a character in scaphopod taxonomy themselves?

As long as readers heed the cautions that Lamprell and Healy have stressed in their descriptions and in the foreword to their keys - about not attempting to identify single, eroded, or juvenile shells - the majority of the keys work very well. After giving this monograph a thorough 'road test' with the scaphopod collection in the Museum and Art Gallery of the Northern Territory I am convinced the work is vastly better for the inclusion of keys than it would have been without them.

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